

General Description

It combines trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for motor driver, load switch and battery protection applications.

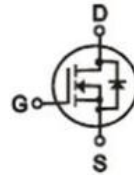
Features

- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

Application

- BLDC Motor driver
- SMPS 2nd Synchronous Rectifier
- Battery protection

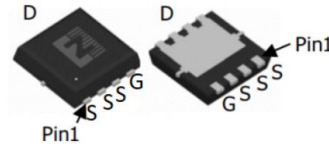
Product Summary



$$V_{DS}=40V$$

$$R_{DS(ON)}=8m\Omega$$

$$I_D=35A$$



DFN3 x 3

Ordering Information:

Part NO.	ZM074N04M
Marking	074N04
Packing Information	REEL TAPE
Basic ordering unit (pcs)	5000

Absolute Maximum Ratings ($T_C=25^{\circ}C$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D@T_C=25^{\circ}C$	35	A
	$I_D@T_C=75^{\circ}C$	26	A
	$I_D@T_C=100^{\circ}C$	22	A
Pulsed Drain Current ^①	I_{DM}	105	A
Total Power Dissipation	$P_D@T_C=25^{\circ}C$	43	W
Total Power Dissipation	$P_D@T_A=25^{\circ}C$	2.3	W
Operating Junction Temperature	T_J	-55 to 150	$^{\circ}C$
Storage Temperature	T_{STG}	-55 to 150	$^{\circ}C$
Single Pulse Avalanche Energy ($L=0.1mH, V_{GS}=10V, R_g=25\Omega, T_J=25^{\circ}C$)	E_{AS}	40	mJ
ESD Level (HBM)		Class 1C	

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	2.9	°C/W
Thermal resistance, junction - ambient ^②	R_{thJA}	-	-	54	°C/W
Soldering temperature, wave soldering for 10s	T_{sold}	-	-	260	°C

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.4		2.5	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=40V, V_{GS}=0V$			1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=24A$		8	12	m Ω
		$V_{GS}=4.5V, I_D=12A$		13	17	m Ω
Forward Trans conductance	g_{FS}	$V_{DS}=10V, I_D=10A$		8		S
Source-drain voltage	V_{SD}	$I_S=24A$			1.28	V

•Dynamic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Resistance	R_G	$f = 1MHz$		1.4		Ω
Input capacitance	C_{iss}	$f = 1MHz$ $V_{DS}=25V$	-	1930	-	pF
Output capacitance	C_{oss}		-	154	-	
Reverse transfer capacitance	C_{rss}		-	110	-	
Total gate charge	Q_g	$V_{DD}=25V$ $I_D=20A$ $V_{GS}=10V$	-	30	-	nC
	$Q_g(4.5v)$			13		
Gate - Source charge	Q_{gs}		-	5.4	-	
Gate - Drain charge	Q_{gd}		-	5.9	-	
Turn-ON Delay time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=15V$ $R_G=3.3\Omega,$ $I_D=20A$		8		ns
Turn-ON Rise time	t_r			2.5		ns
Turn-Off Delay time	$t_{D(off)}$			41		ns
Turn-Off Fall time	t_f			8		ns
Reverse Recovery Time	t_{RR}	$V_{DD}=20V, dI_S/dt$ $=100A/s, I_S=30A$		11		ns
Reverse Recovery Charge	Q_{RR}			20		ns

Fig.1 Power Dissipation

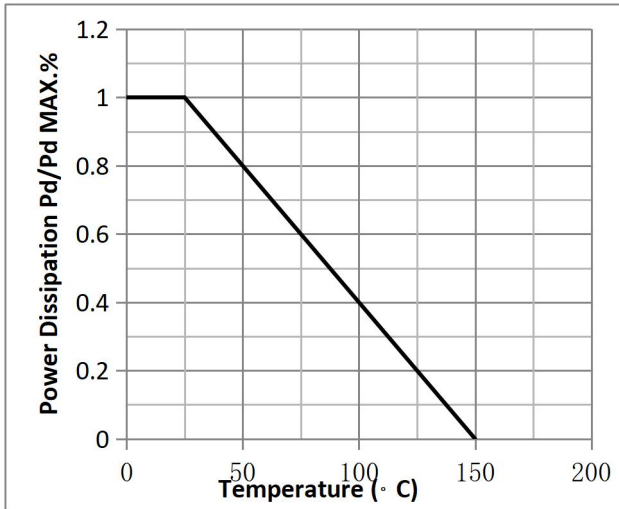


Fig.2 Typical output Characteristics

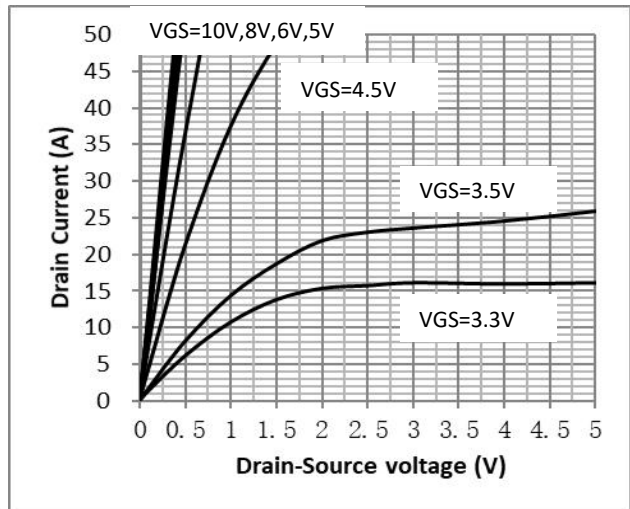


Fig.3 Threshold Voltage V.S Junction Temperature

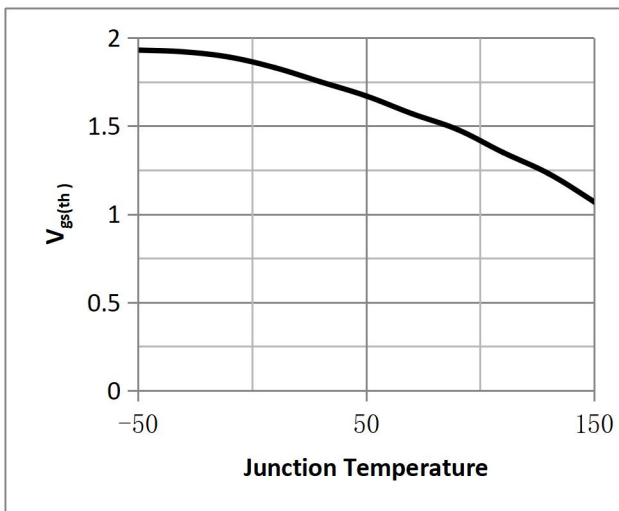


Fig.4 Resistance V.S Drain Current

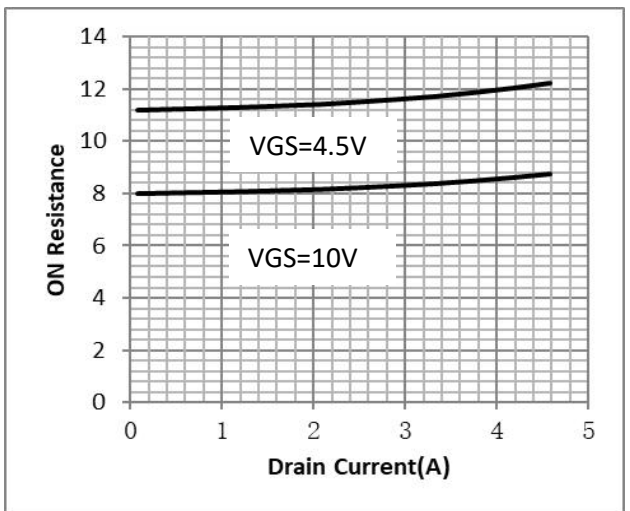


Fig.5 On-Resistance VS Gate Source Voltage

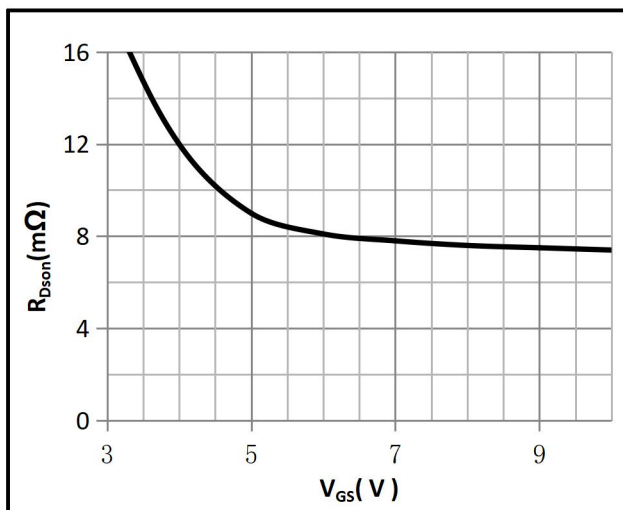


Fig.6 On-Resistance V.S Junction Temperature

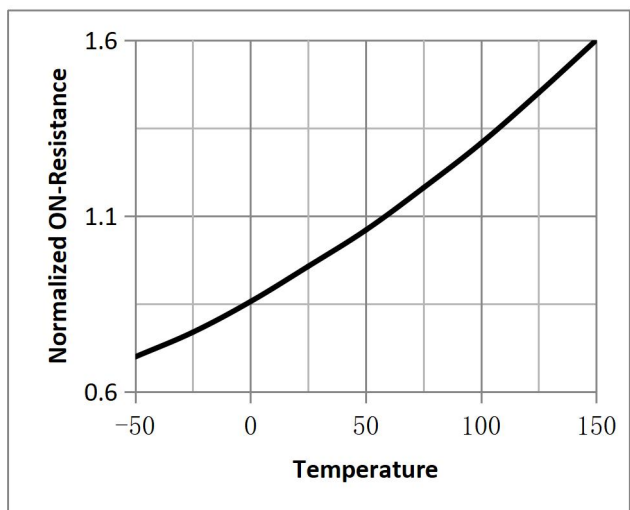


Fig.7 SOA Maximum Safe Operating Area

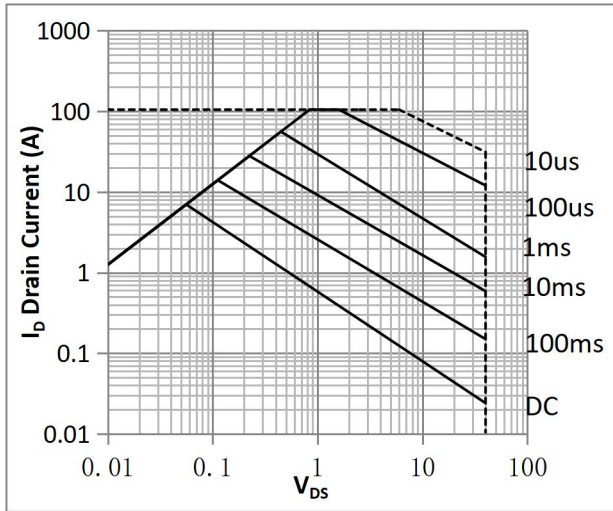


Fig.8 ID-Junction Temperature

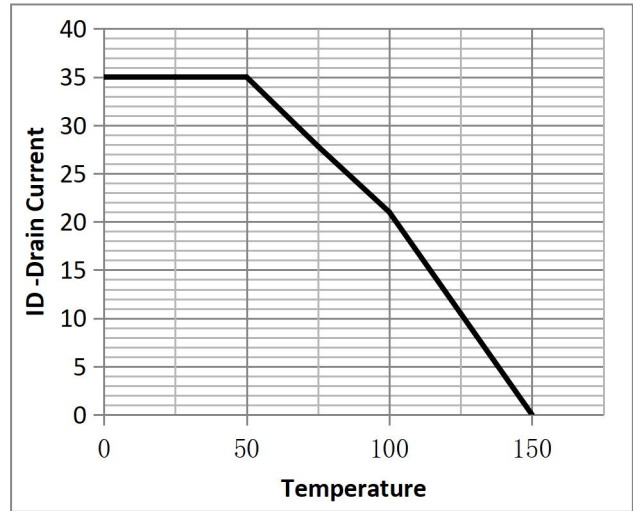


Figure 9. Diode Forward Voltage vs. Current

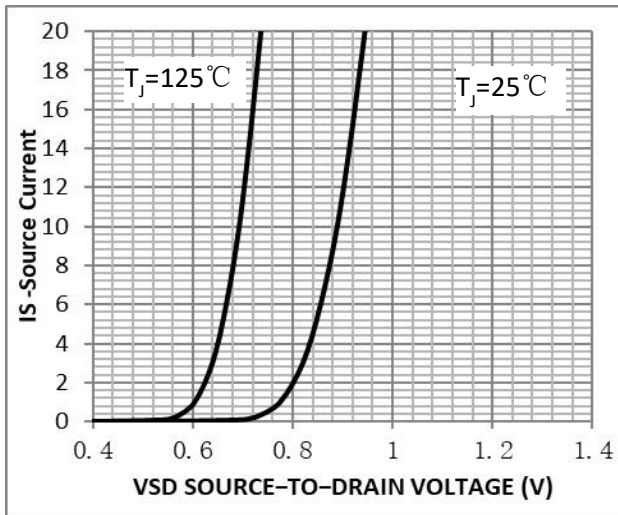


Figure 10. Transfer Characteristics

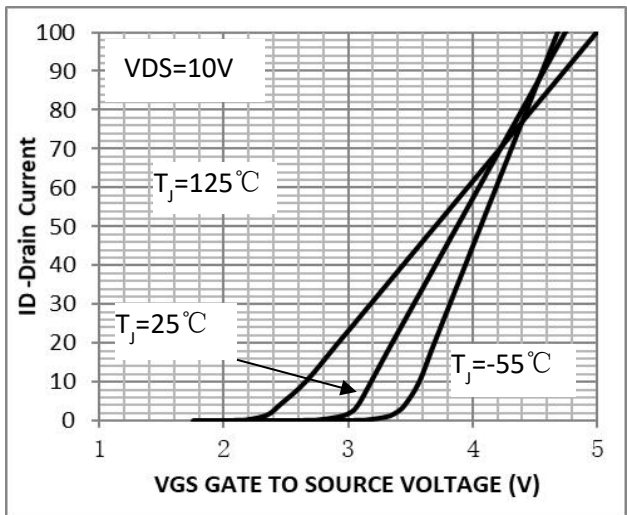


Figure 11. Gate-to-Source and
Drain-to-Source Voltage vs. Total Charge

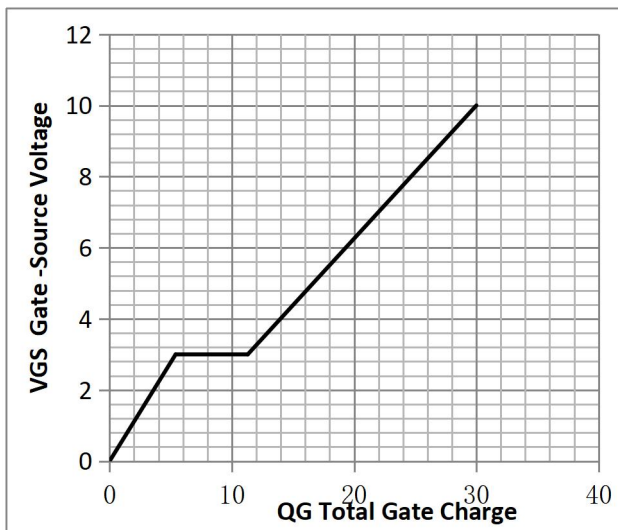


Fig.12 Capacitance Variation

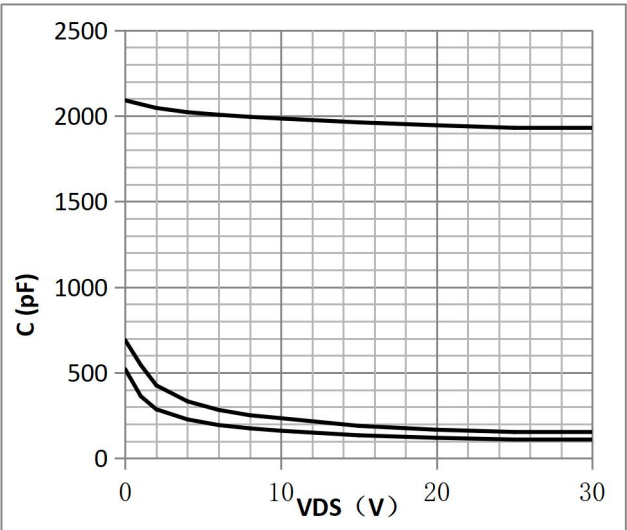


Fig.13 Switching Time Measurement Circuit

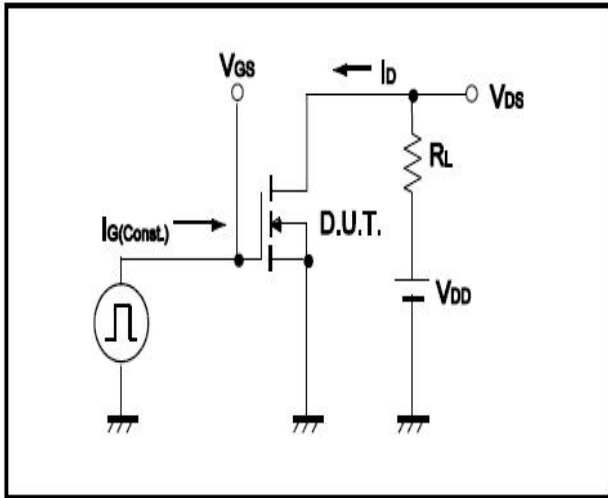


Fig.14 Gate Charge Waveform

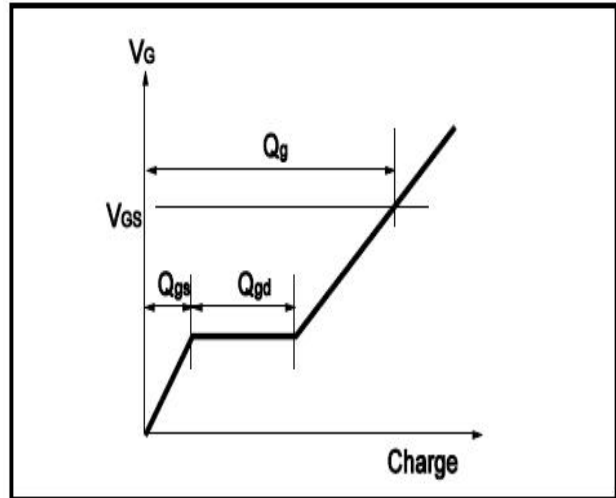


Fig.15 Switching Time Measurement Circuit

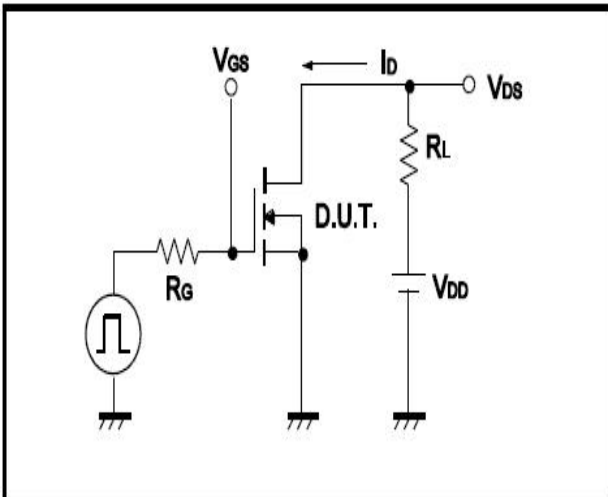


Fig.16 Gate Charge Waveform

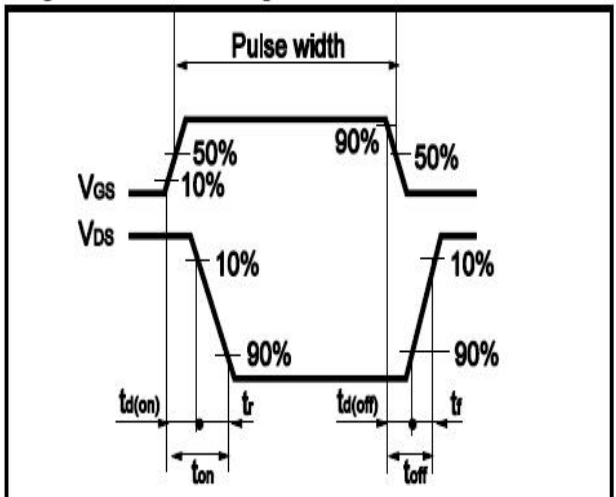


Fig.17 Avalanche Measurement Circuit

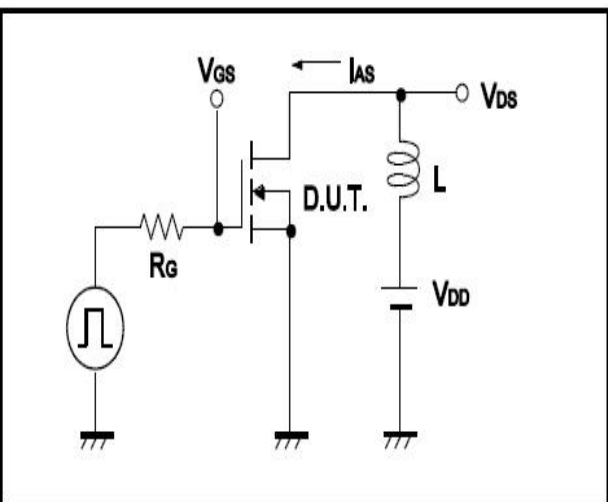
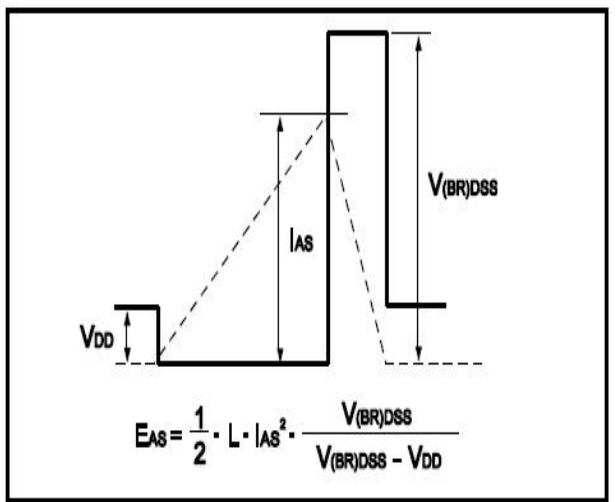


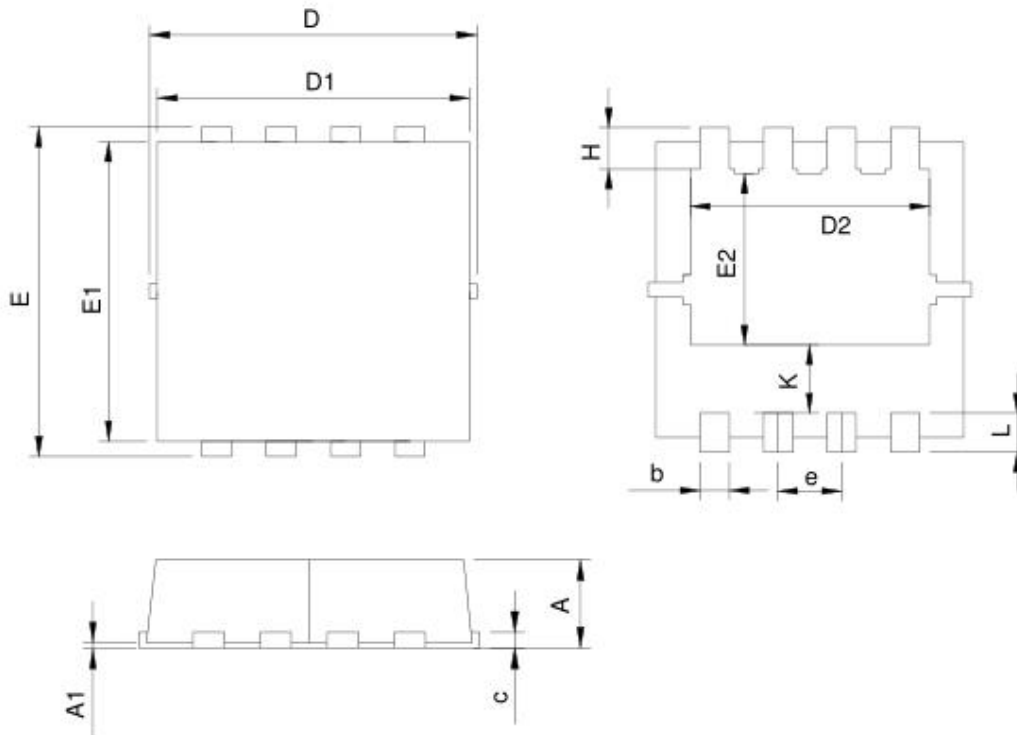
Fig.18 Avalanche Waveform





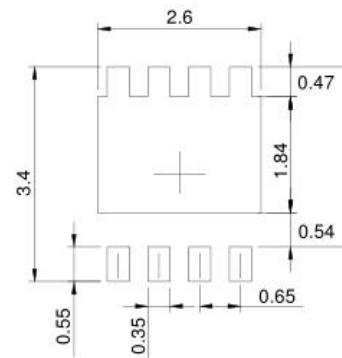
●Dimensions(DFN3×3)

Unit: mm



SYMBOL	DFN3.3x3.3-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	1.00	0.028	0.039
A1	0.00	0.05	0.000	0.002
b	0.25	0.35	0.010	0.014
c	0.14	0.20	0.006	0.008
D	3.10	3.50	0.122	0.138
D1	3.05	3.25	0.120	0.128
D2	2.35	2.55	0.093	0.100
E	3.10	3.50	0.122	0.138
E1	2.90	3.10	0.114	0.122
E2	1.64	1.84	0.065	0.072
e	0.65 BSC		0.026 BSC	
H	0.32	0.52	0.013	0.020
K	0.59	0.79	0.023	0.031
L	0.25	0.55	0.010	0.022

RECOMMENDED LAND PATTERN



UNIT: mm



Note: ① Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$;

② Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;

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